"SARS in the City": the Toronto experience

Bonnie Henry MD MPH FRCP(C)
Associate Medical Officer of Health
Toronto Public Health

PHIN, Atlanta 24 May 2004

TORONTO Public Health

TORONTO Public Health

What is SARS?

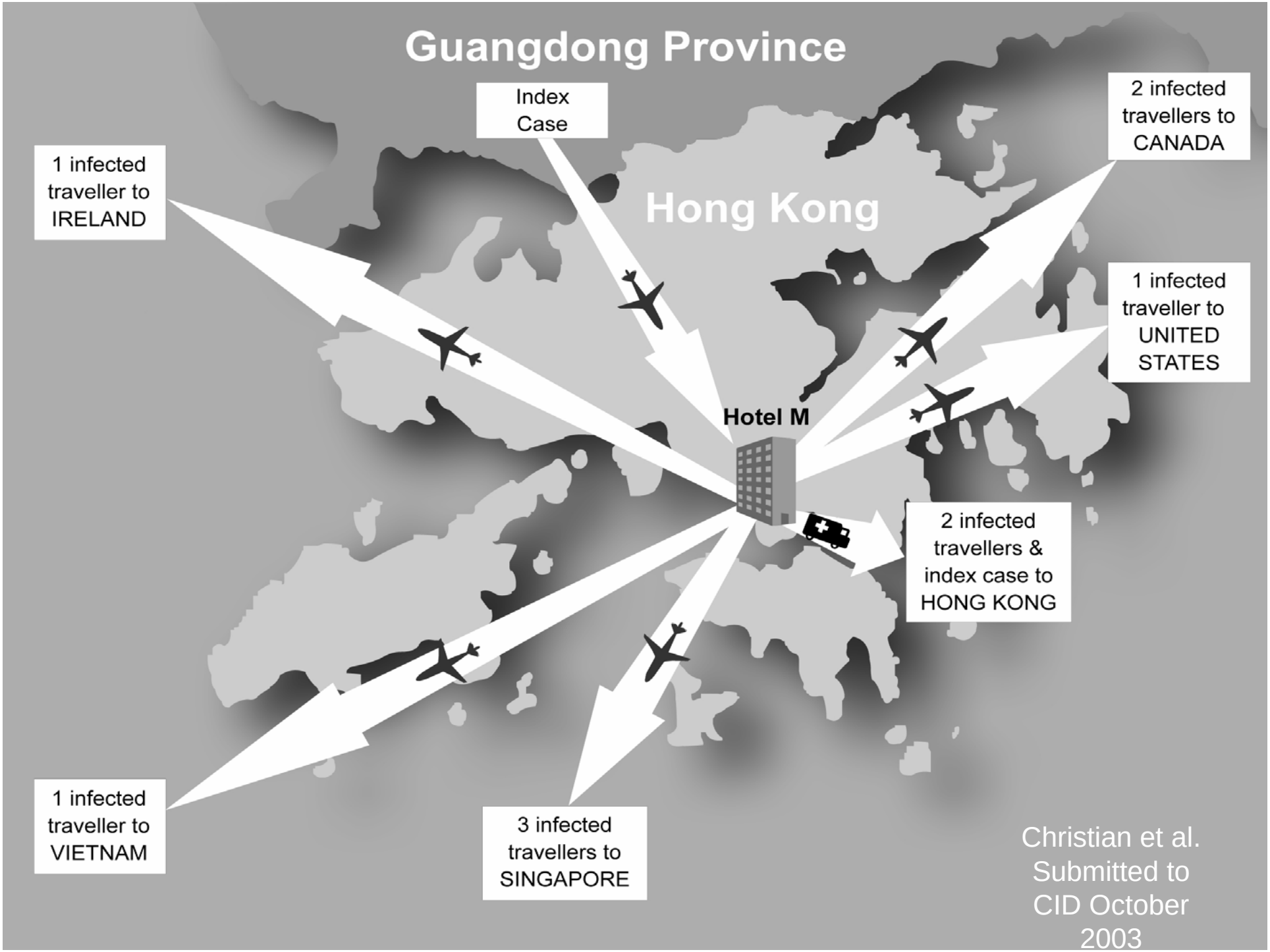
- **S**evere **A**cute **R**espiratory **S**yndrome
- Symptoms include:
  - *a fever of more than 38 degrees C (100.4 degrees F)*
  - *muscle aches, severe fatigue, severe headache*
  - *dry cough, shortness of breath*
  - *positive chest x-ray*

TORONTO Public Health

Where it began..

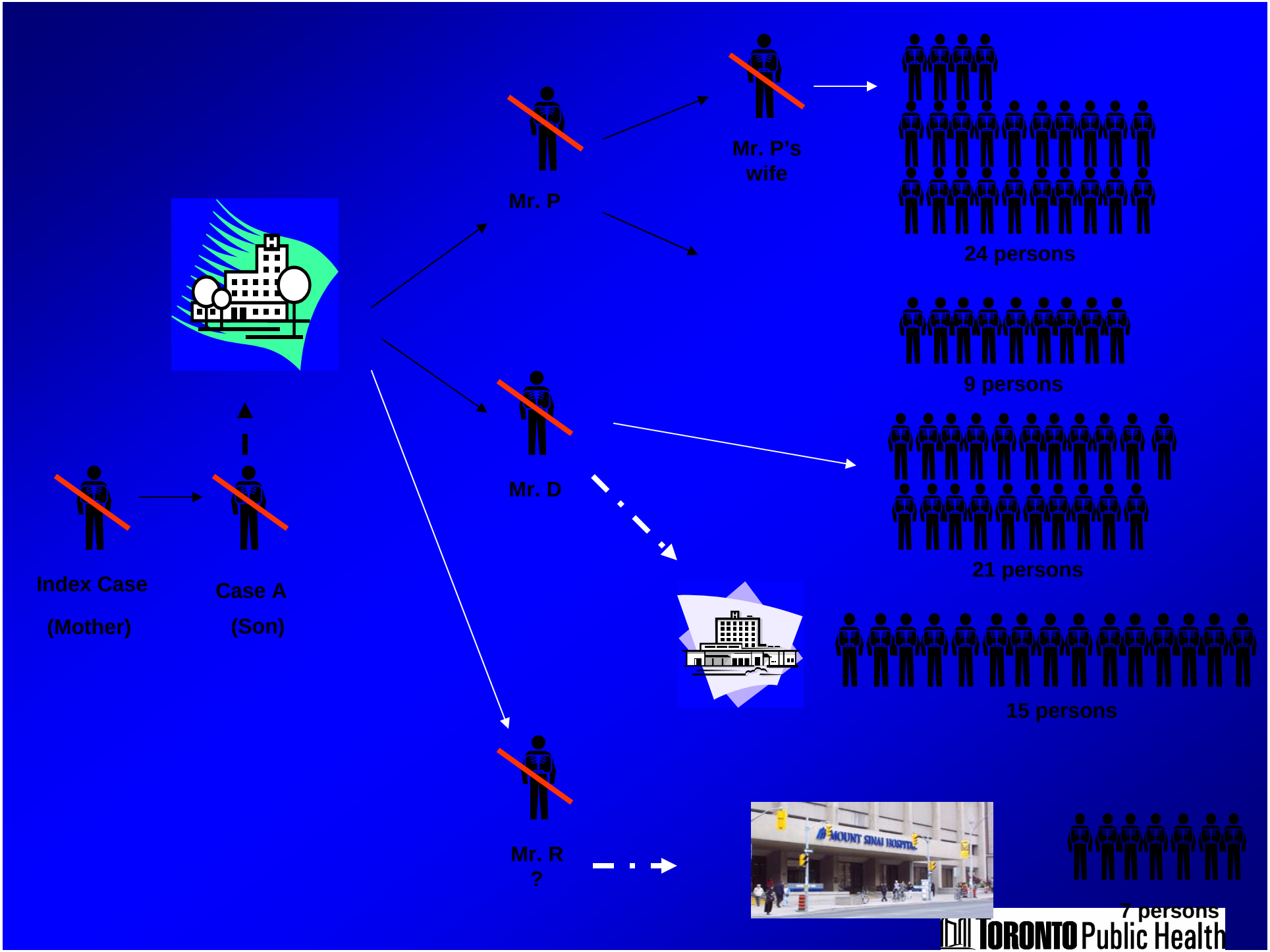
- 21 February, 2003 a Chinese Doctor from Guandong checks into room 911 at the Metropole hotel….

TORONTO Public Health


Guangdong Province
Index Case
2 infected travellers to CANADA
1 infected traveller to IRELAND
Hong Kong
1 infected traveller to UNITED STATES
Hotel M
2 infected travellers & index case to HONG KONG
1 infected traveller to VIETNAM
3 infected travellers to SINGAPORE
Christian et al. Submitted to CID October 2003

A Brief Chronology

- Toronto's first SARS case reported as possible TB on March 9
- WHO alert of "atypical pneumonia" March 12
- First case in hospital dies March 13; 4 family members admitted with illness
- Joint press conference March 14
- Illness in hospital workers March 21
- Made a reportable disease March 24, 2003
- Designated 'Communicable and virulent'


Mr. P
Mr. P's wife
24 persons
9 persons
Mr. D
21 persons
Index Case
(Mother)
Case A
(Son)
15 persons
Mr. R
?
7 persons
MOUNT SINAI HOSPITAL
TORONTO Public Health

A Brief Chronology

- Establishment of “SARS” ward March 23
- Closing of index hospital March 25
- Provincial health emergency declared Mar 26
- Provincial leadership and first infection control directives to hospitals, LTCF, MD’s, CHC’s…March 27; formation of “Science Committee”
- Closing of second hospital March 28
- Cluster of cases in ‘protected’ workers April 16
- WHO travel advisory April 23-29

A Brief Chronology

- Outbreak thought to be over May 16
- “New Normal” directives issued
- Unrecognized cases and spread in a new hospital May 23
- Phase 2 limited to hospital patients, HCWs and visitors
- Last case ill June 12, 2003

A Brief Chronology

- Phase 1: Mar 13 - Apr 20
- Phase 2: May 20 - Jun 24
- 438 cases across Canada (225 in Toronto)
  - 44 deaths (38 in Toronto)
  - 222 hospitalized, 50 in Intensive Care Units
  - 50% in health care workers (4 deaths)
  - cluster of 31 cases associated with a religious group
  - no significant community spread

Figure 1: Toronto SARS Cases* Contacts Requiring Quarantine†

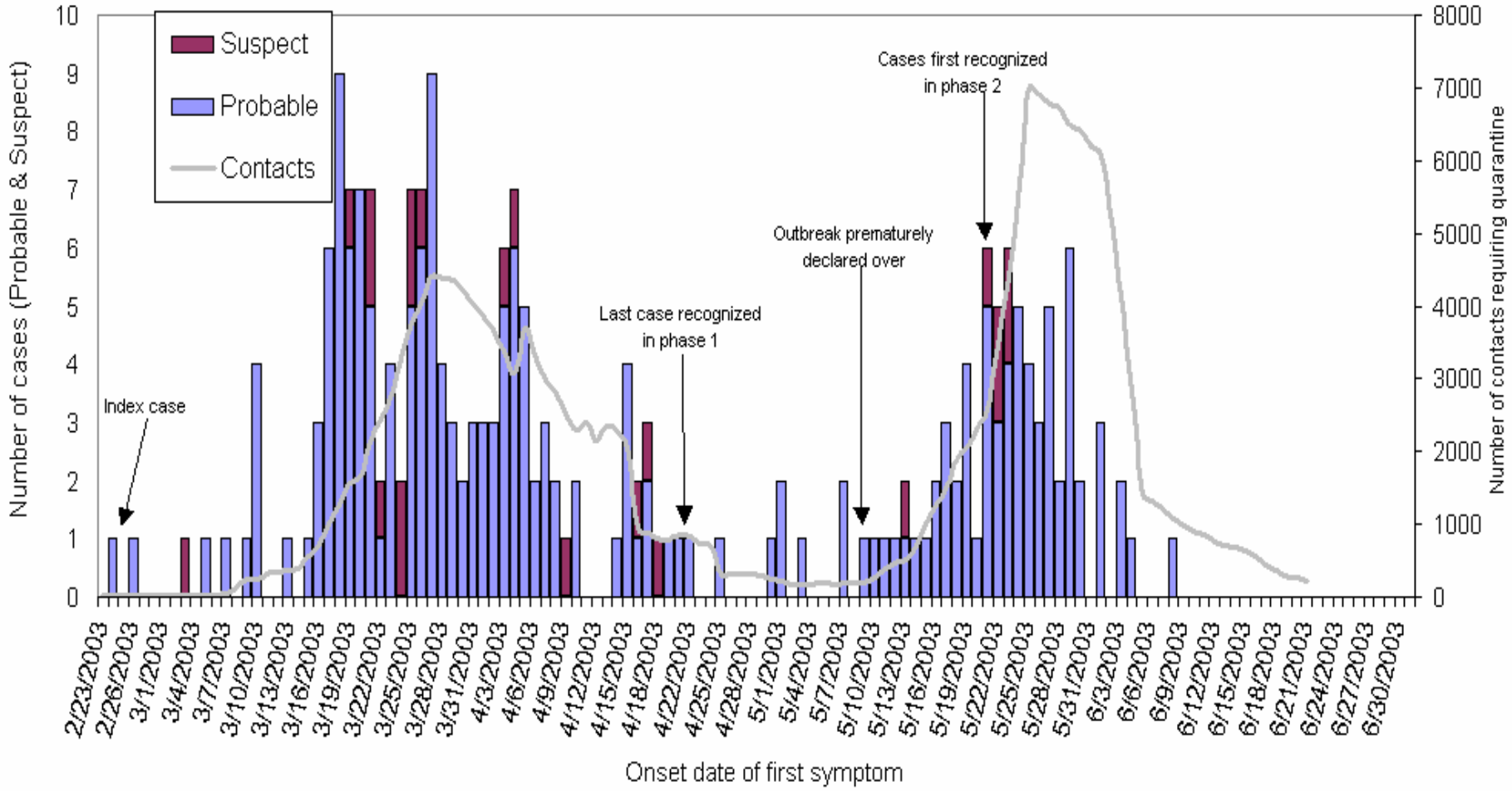
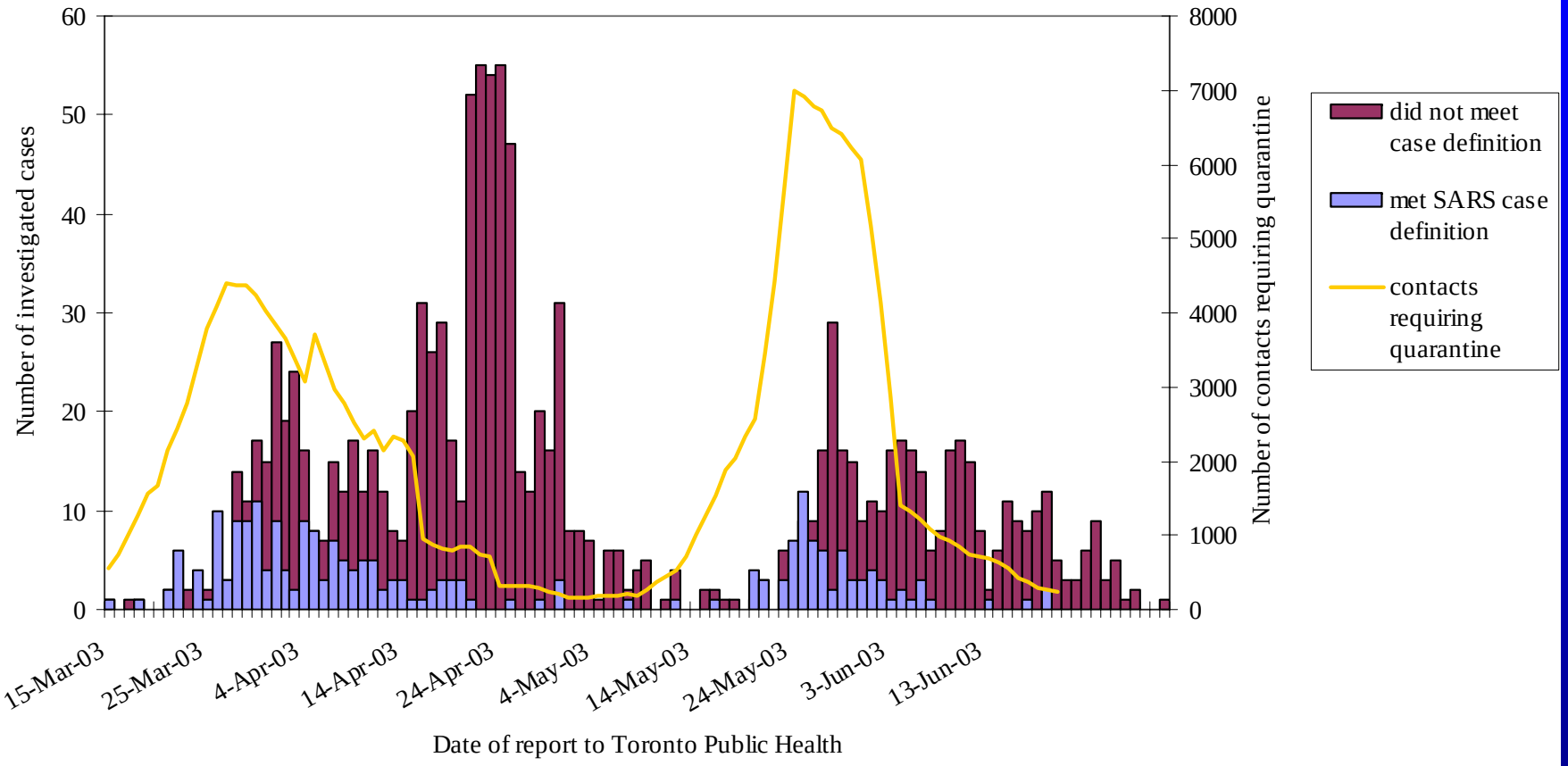


Figure 2. Cases investigated for SARS and contacts identified as requiring quarantine



TORONTO Public Health

Epidemiology

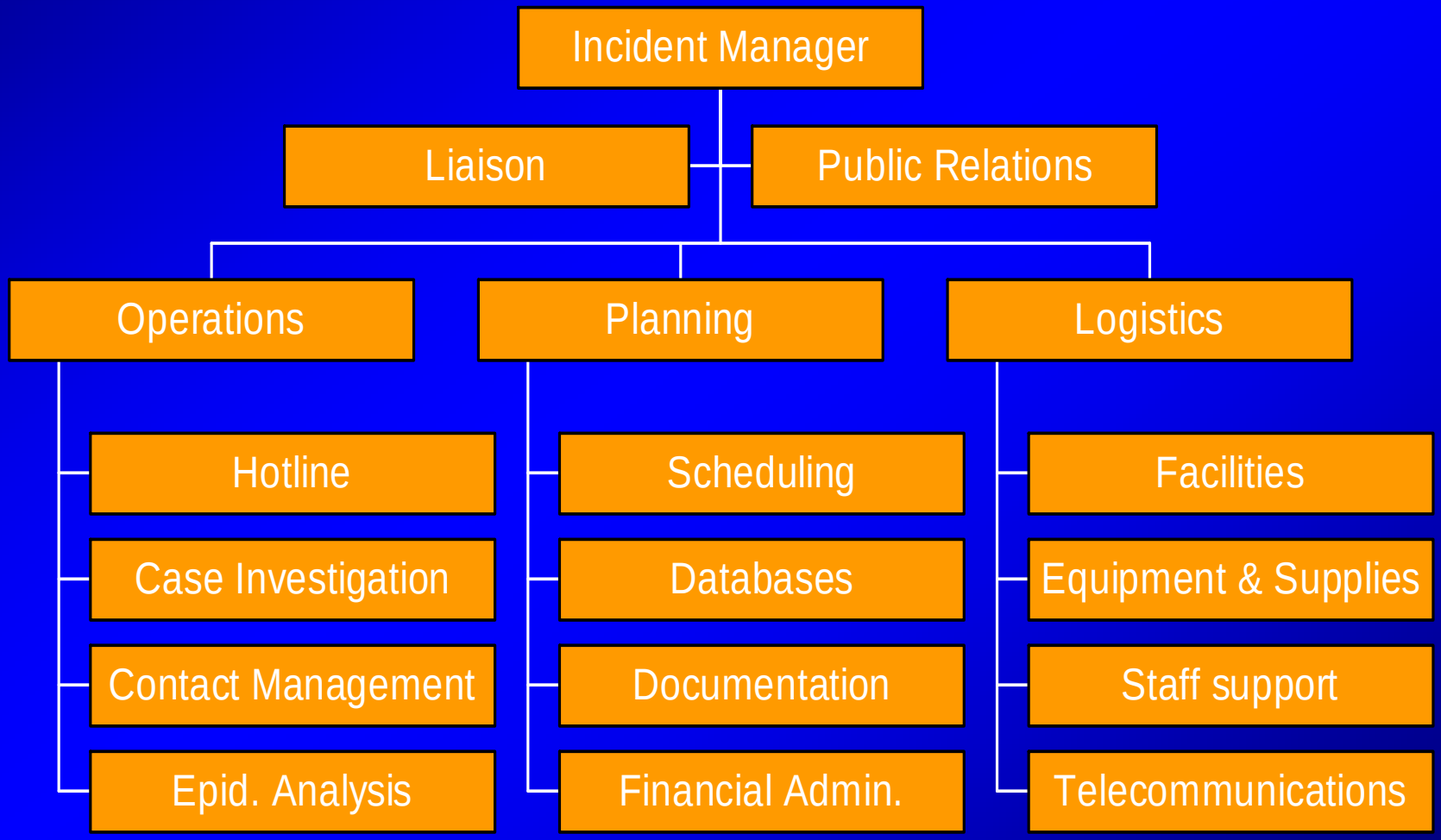
- Average incubation period 4.7 days (range 1-12)
- 66% of cases were female
- Average age of those who died 71 (39-100)
- Only 3 deaths in persons less than 50
- Mean time from onset of symptoms to death 19 days (1-43)

What was the role of TPH?

- Investigation of possible cases
- Quarantine of close contacts
- Isolation orders if necessary
- Health risk assessment and communication
- Disease surveillance and reporting
- Managing community relations

TORONTO Public Health

Incident Command Structure



TORONTO Public Health

Workload Indicators

- 316,615 calls to Hotline, daily peak of 47,567
- 2,132 case investigations (av. 9 hours each), all extremely time sensitive
- 199 Probable Cases and 26 Suspect Cases
- 23,103 contacts followed up, 13,374 in quarantine
- 27 isolation orders issued under the HPPA
- acute event lasted 14 weeks

Staffing

- Up to 400 staff on duty each day
- 700 staff assigned full-time
- 2 shifts per day (8 a.m.-11 p.m.), 7 days/week
- Active assistance from Province
- Many others came to help:
  - *Other public health units*
  - *Community Medicine Specialists*
  - *Health Canada*
  - *Department of National Defence*

TORONTO Public Health

Intense Media Interest

- 2nd only to Iraq War
- Daily media briefings, televised live
- Over 1,200 media calls in the first 8 weeks
- Daily print/electronic, local/ethnic, international
- Multiple spokespersons, many opinions...

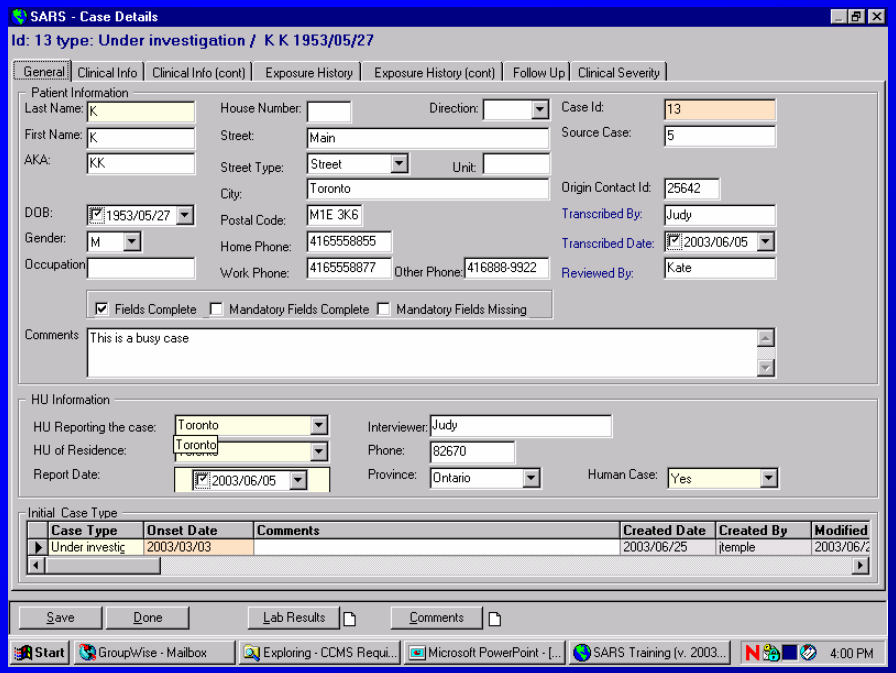
TORONTO Public Health

Communication Methods

- Fact sheets for different audiences
- Quarantine directives for affected groups
- Print/web material translated into 14 languages
- Diverse language skills among Hotline staff plus AT&T translation service
- Train-the-trainer sessions for community agencies
- Local community meetings - health risks, ethnic discrimination
- Standard letters to conference planners
- Shared hard drive for common protocols, etc.

Case Contact Management System

- Required for both case & contact management plus analysis of data
- Extremely high volumes of work requiring very fast turn around time
- Improved quality control
- Planned & designed as an interim solution



TORONTO Public Health

System Strengths & ...

- Unlimited number of users
- User friendly system
- Incorporates quarantine requirements
- Enables user to manage large volumes of data
- Incorporates QA requirements

...Limitations

- Currently limited to City of Toronto
- Planned as an interim solution, requirements gathering and testing were rushed
- Case management component more complex resulting in challenges in extracting epi data for analysis

PowerCase

- Case management
  system develop
  Community
- Under
  Pow
  to assist with the
  in a new setting

TORONTO Public Health

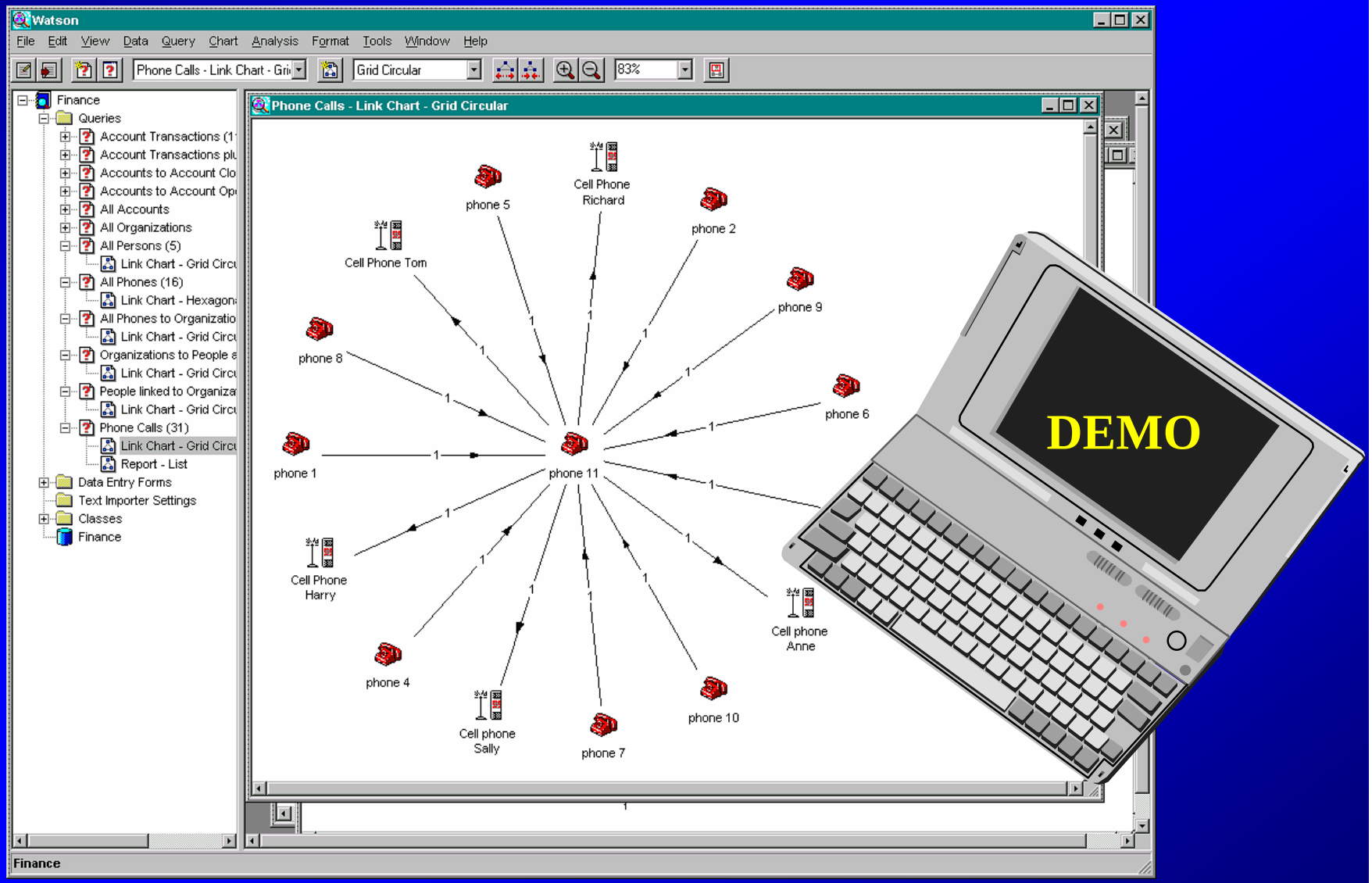
How Did TPH Get Into Exploring PowerCase?

In the SARS outbreak:

- traditional proce[illegible] being used [illegible] logical linkages
- e[illegible] logical [illegible] with data [illegible] and analysis

TORONTO Public Health

PowerCase



TORONTO Public Health

Stakeholder Communications

- Within TPH
- Other City departments, TEMS, police and fire
- Unions, joint health & safety committees
- Health facilities and service providers
- Workplaces, schools/school boards
- Jails, homeless shelters & advocates
- Churches, religious leaders, community groups
- Conference planners & associations
- Other levels of government

Occupational Health & Safety Issues

- Created a special Family Health team for home visits of clients in quarantine
- Respiratory / contact protection for TPH staff in hospitals
- Some City staff quarantined due to occupational exposure to SARS
- Psychosocial impacts across the board - fear, grief, stress, exhaustion
- Positive sense of contribution and teamwork

Protective Barriers: N95 masks, face shields, gown and gloves

TORONTO Public Health


MEDICAL IMAGING
Think for Yourself

Community Impacts from SARS

- Widespread program cancellations (public health, hospital, long term care, community services)
- Psychological isolation among patients, health care workers and quarantined contacts
- Economic hardship for hospitality / tourism industries and Chinese businesses
- Academic impact on students in affected schools and universities


ENTER
ONLY

Outbreak Control

How do you stop an outbreak when:

- Agent is unknown
- Incubation period uncertain
- Mode of transmission not entirely clear
- No diagnostic test
- No prophylaxis
- No vaccine
- No treatment

R_0 = population density x infectivity x time

TORONTO Public Health

Isolation/Quarantine

- Quarantine
  - not used > 50 years in Canada
  - “invented” work quarantine
- Used combination of
  - quarantine/work quarantine with daily or twice daily assessment
  - active surveillance with daily assessment
  - self-monitoring with periodic follow-up
  - day 10 follow-up and counselling

Isolation/Quarantine

- Linkage of symptomatic contacts to assessment centres
- “Voluntary” quarantine - issues
- Issued 27 Section 22 orders under HPPA
- Challenges of determining if someone is at home by phone e.g. cell phones, internet, lack of phone
- Government financial support
- Very difficult mentally, physically, emotionally and financially

Isolation/Quarantine

- Resources & psychosocial support to individuals/communities who were quarantined
  - One-on-one support by telephone through hotline (staffed by PHNs and Mental Health team) and group teleconferences
  - Partnerships e.g.:
    - police - spot checks, serve orders
    - Emergency Medical Services
    - linked with Red Cross and Salvation Army to provide masks, thermometers, food, etc.

Isolation/Quarantine

- Homeless/shelter population
  - worked with shelters on screening
  - had only 6-8 quarantine beds
- Jails/schools/workplaces/transit
  - need for support, risk assessment, contingency planning, etc.

Isolation/Quarantine

- Community Issues
  - Post-quarantine acceptance back into schools and workplaces
  - Stigmatization of affected groups e.g. Chinese community
  - Acknowledge and deal with discrimination - worked with community leaders
  - Address anxiety or fear

Isolation/Quarantine

- Legal Issues/Challenges
  - Issued 27 orders under Section 22 of Health Protection and Promotion Act, no orders under section 35
  - One appeal; withdrawn

  - Designated ‘communicable and virulent’
  - Group orders
  - Able to detain at facility other than hospital

Lessons from SARS

- Existing programs and relationships are what work
- Communication is key
- The big risk is unrecognized patients
  - Patients and visitors get sick as well as HCWs
- SARS transmission is primarily droplet
  - Some situations are higher risk than other
- It is easier to control disease than fear
  - Science/content expertise gets lost in politics


THE BEST MEDICINE


CANADA'S WORST NIGHTMARE...
NEASES, '03
- A MAD COW IN A SARS MASK BEING BITTEN BY A WEST NILE MOSQUITO.